

## RAW SEQUENCE LISTING

The Biotechnology Systems Branch of the Scientific and Technical Information Center (STIC) no errors detected.

Application Serial Number: 10/510,628  
Source: PCT  
Date Processed by STIC: 10-16-04

# ***ENTERED***



PCT

## RAW SEQUENCE LISTING

DATE: 10/16/2004

PATENT APPLICATION: US/10/510,628

TIME: 08:47:58

Input Set : A:\231181.ST25.txt

Output Set: N:\CRF4\10162004\J510628.raw

3 <110> APPLICANT: HEGEMANN, Peter  
 5 <120> TITLE OF INVENTION: USE OF BIOLOGICAL PHOTORECEPTORS AS DIRECTLY LIGHT-  
 CONTROLLED  
 6 ION CHANNELS  
 8 <130> FILE REFERENCE: 231181  
 C--> 10 <140> CURRENT APPLICATION NUMBER: US/10/510,628  
 C--> 10 <141> CURRENT FILING DATE: 2004-10-08  
 10 <160> NUMBER OF SEQ ID NOS: 4  
 12 <170> SOFTWARE: PatentIn version 3.1  
 14 <210> SEQ ID NO: 1  
 15 <211> LENGTH: 712  
 16 <212> TYPE: PRT  
 17 <213> ORGANISM: Chlamydomonas reinhardtii  
 19 <220> FEATURE:  
 20 <223> OTHER INFORMATION: Amino acid sequence of CHOP-1 (AF461397) from  
 21 Chlamydomonas reinhardtii  
 23 <400> SEQUENCE: 1  
 25 Met Ser Arg Arg Pro Trp Leu Leu Ala Leu Ala Leu Ala Val Ala Leu  
 26 1 5 10 15  
 28 Ala Ala Gly Ser Ala Gly Ala Ser Thr Gly Ser Asp Ala Thr Val Pro  
 29 20 25 30  
 31 Val Ala Thr Gln Asp Gly Pro Asp Tyr Val Phe His Arg Ala His Glu  
 32 35 40 45  
 34 Arg Met Leu Phe Gln Thr Ser Tyr Thr Leu Glu Asn Asn Gly Ser Val  
 35 50 55 60  
 37 Ile Cys Ile Pro Asn Asn Gly Gln Cys Phe Cys Leu Ala Trp Leu Lys  
 38 65 70 75 80  
 40 Ser Asn Gly Thr Asn Ala Glu Lys Leu Ala Ala Asn Ile Leu Gln Trp  
 41 85 90 95  
 43 Ile Thr Phe Ala Leu Ser Ala Leu Cys Leu Met Phe Tyr Gly Tyr Gln  
 44 100 105 110  
 46 Thr Trp Lys Ser Thr Cys Gly Trp Glu Glu Ile Tyr Val Ala Thr Ile  
 47 115 120 125  
 49 Glu Met Ile Lys Phe Ile Ile Glu Tyr Phe His Glu Phe Asp Glu Pro  
 50 130 135 140  
 52 Ala Val Ile Tyr Ser Ser Asn Gly Asn Lys Thr Val Trp Leu Arg Tyr  
 53 145 150 155 160  
 55 Ala Glu Trp Leu Leu Thr Cys Pro Val Ile Leu Ile His Leu Ser Asn  
 56 165 170 175  
 58 Leu Thr Gly Leu Ala Asn Asp Tyr Asn Lys Arg Thr Met Gly Leu Leu  
 59 180 185 190  
 61 Val Ser Asp Ile Gly Thr Ile Val Trp Gly Thr Thr Ala Ala Leu Ser  
 62 195 200 205  
 64 Lys Gly Tyr Val Arg Val Ile Phe Phe Leu Met Gly Leu Cys Tyr Gly

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65      210      215      220
67 Ile Tyr Thr Phe Phe Asn Ala Ala Lys Val Tyr Ile Glu Ala Tyr His
68 225      230      235      240
70 Thr Val Pro Lys Gly Ile Cys Arg Asp Leu Val Arg Tyr Leu Ala Trp
71      245      250      255
73 Leu Tyr Phe Cys Ser Trp Ala Met Phe Pro Val Leu Phe Leu Leu Gly
74      260      265      270
76 Pro Glu Gly Phe Gly His Ile Asn Gln Phe Asn Ser Ala Ile Ala His
77      275      280      285
79 Ala Ile Leu Asp Leu Ala Ser Lys Asn Ala Trp Ser Met Met Gly His
80      290      295      300
82 Phe Leu Arg Val Lys Ile His Glu His Ile Leu Leu Tyr Gly Asp Ile
83 305      310      315      320
85 Arg Lys Lys Gln Lys Val Asn Val Ala Gly Gln Glu Met Glu Val Glu
86      325      330      335
88 Thr Met Val His Glu Glu Asp Asp Glu Thr Gln Lys Val Pro Thr Ala
89      340      345      350
91 Lys Tyr Ala Asn Arg Asp Ser Phe Ile Ile Met Arg Asp Arg Leu Lys
92      355      360      365
94 Glu Lys Gly Phe Glu Thr Arg Ala Ser Leu Asp Gly Asp Pro Asn Gly
95      370      375      380
97 Asp Ala Glu Ala Asn Ala Ala Ala Gly Gly Lys Pro Gly Met Glu Met
98 385      390      395      400
100 Gly Lys Met Thr Gly Met Gly Met Gly Met Gly Ala Gly Met Gly Met
101      405      410      415
103 Ala Thr Ile Asp Ser Gly Arg Val Ile Leu Ala Val Pro Asp Ile Ser
104      420      425      430
106 Met Val Asp Phe Phe Arg Glu Gln Phe Ala Arg Leu Pro Val Pro Tyr
107      435      440      445
109 Glu Leu Val Pro Ala Leu Gly Ala Glu Asn Thr Leu Gln Leu Val Gln
110      450      455      460
112 Gln Ala Gln Ser Leu Gly Gly Cys Asp Phe Val Leu Met His Pro Glu
113 465      470      475      480
115 Phe Leu Arg Asp Arg Ser Pro Thr Gly Leu Leu Pro Arg Leu Lys Met
116      485      490      495
118 Gly Gly Gln Arg Ala Ala Ala Phe Gly Trp Ala Ala Ile Gly Pro Met
119      500      505      510
121 Arg Asp Leu Ile Glu Gly Ser Gly Val Asp Gly Trp Leu Glu Gly Pro
122      515      520      525
124 Ser Phe Gly Ala Gly Ile Asn Gln Gln Ala Leu Val Ala Leu Ile Asn
125      530      535      540
127 Arg Met Gln Gln Ala Lys Lys Met Gly Met Met Gly Gly Met Gly Met
128 545      550      555      560
130 Gly Met Gly Gly Gly Met Gly Met Gly Met Gly Met Gly Met Gly Met
131      565      570      575
133 Ala Pro Ser Met Asn Ala Gly Met Thr Gly Gly Met Gly Gly Ala Ser
134      580      585      590
136 Met Gly Gly Ala Val Met Gly Met Gly Met Gly Met Gln Pro Met Gln
137      595      600      605

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139 Gln Ala Met Pro Ala Met Ser Pro Met Met Thr Gln Gln Pro Ser Met
140      610                      615                      620
142 Met Ser Gln Pro Ser Ala Met Ser Ala Gly Gly Ala Met Gln Ala Met
143 625                      630                      635                      640
145 Gly Gly Val Met Pro Ser Pro Ala Pro Gly Gly Arg Val Gly Thr Asn
146                      645                      650                      655
148 Pro Leu Phe Gly Ser Ala Pro Ser Pro Leu Ser Ser Gln Pro Gly Ile
149                      660                      665                      670
151 Ser Pro Gly Met Ala Thr Pro Pro Ala Ala Thr Ala Ala Pro Ala Ala
152                      675                      680                      685
154 Gly Gly Ser Glu Ala Glu Met Leu Gln Gln Leu Met Ser Glu Ile Asn
155      690                      695                      700
157 Arg Leu Lys Asn Glu Leu Gly Glu
158 705                      710
160 <210> SEQ ID NO: 2
161 <211> LENGTH: 737
162 <212> TYPE: PRT
163 <213> ORGANISM: Chlamydomonas reinhardtii
165 <220> FEATURE:
166 <223> OTHER INFORMATION: Amino acid sequence of CHOP-2 (AF461397) from
167      Chlamydomonas reinhardtii
169 <400> SEQUENCE: 2
171 Met Asp Tyr Gly Gly Ala Leu Ser Ala Val Gly Arg Glu Leu Leu Phe
172 1      5      10      15
174 Val Thr Asn Pro Val Val Val Asn Gly Ser Val Leu Val Pro Glu Asp
175      20      25      30
177 Gln Cys Tyr Cys Ala Gly Trp Ile Glu Ser Arg Gly Thr Asn Gly Ala
178      35      40      45
180 Gln Thr Ala Ser Asn Val Leu Gln Trp Leu Ala Ala Gly Phe Ser Ile
181      50      55      60
183 Leu Leu Leu Met Phe Tyr Ala Tyr Gln Thr Trp Lys Ser Thr Cys Gly
184 65      70      75      80
186 Trp Glu Glu Ile Tyr Val Cys Ala Ile Glu Met Val Lys Val Ile Leu
187      85      90      95
189 Glu Phe Phe Phe Glu Phe Lys Asn Pro Ser Met Leu Tyr Leu Ala Thr
190      100     105     110
192 Gly His Arg Val Gln Trp Leu Arg Tyr Ala Glu Trp Leu Leu Thr Cys
193      115     120     125
195 Pro Val Ile Leu Ile His Leu Ser Asn Leu Thr Gly Leu Ser Asn Asp
196      130     135     140
198 Tyr Ser Arg Arg Thr Met Gly Leu Leu Val Ser Asp Ile Gly Thr Ile
199 145      150      155      160
201 Val Trp Gly Ala Thr Ser Ala Met Ala Thr Gly Tyr Val Lys Val Ile
202      165     170     175
204 Phe Phe Cys Leu Gly Leu Cys Tyr Gly Ala Asn Thr Phe Phe His Ala
205      180     185     190
207 Ala Lys Ala Tyr Ile Glu Gly Tyr His Thr Val Pro Lys Gly Arg Cys
208      195     200     205
210 Arg Gln Val Val Thr Gly Met Ala Trp Leu Phe Phe Val Ser Trp Gly

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```

211      210      215      220
213 Met Phe Pro Ile Leu Phe Ile Leu Gly Pro Glu Gly Phe Gly Val Leu
214 225      230      235      240
216 Ser Val Tyr Gly Ser Thr Val Gly His Thr Ile Ile Asp Leu Met Ser
217      245      250      255
219 Lys Asn Cys Trp Gly Leu Leu Gly His Tyr Leu Arg Val Leu Ile His
220      260      265      270
222 Glu His Ile Leu Ile His Gly Asp Ile Arg Lys Thr Thr Lys Leu Asn
223      275      280      285
225 Ile Gly Gly Thr Glu Ile Glu Val Glu Thr Leu Val Glu Asp Glu Ala
226      290      295      300
228 Glu Ala Gly Ala Val Asn Lys Gly Thr Gly Lys Tyr Ala Ser Arg Glu
229 305      310      315      320
231 Ser Phe Leu Val Met Arg Asp Lys Met Lys Glu Lys Gly Ile Asp Val
232      325      330      335
234 Arg Ala Ser Leu Asp Asn Ser Lys Glu Val Glu Gln Glu Gln Ala Ala
235      340      345      350
237 Arg Ala Ala Met Met Met Met Asn Gly Asn Gly Met Gly Met Gly Met
238      355      360      365
240 Gly Met Asn Gly Met Asn Gly Met Gly Gly Met Asn Gly Met Ala Gly
241      370      375      380
243 Gly Ala Lys Pro Gly Leu Glu Leu Thr Pro Gln Leu Gln Pro Gly Arg
244 385      390      395      400
246 Val Ile Leu Ala Val Pro Asp Ile Ser Met Val Asp Phe Phe Arg Glu
247      405      410      415
249 Gln Phe Ala Gln Leu Ser Val Thr Tyr Glu Leu Val Pro Ala Leu Gly
250      420      425      430
252 Ala Asp Asn Thr Leu Ala Leu Val Thr Gln Ala Gln Asn Leu Gly Gly
253      435      440      445
255 Val Asp Phe Val Leu Ile His Pro Glu Phe Leu Arg Asp Arg Ser Ser
256      450      455      460
258 Thr Ser Ile Leu Ser Arg Leu Arg Gly Ala Gly Gln Arg Val Ala Ala
259 465      470      475      480
261 Phe Gly Trp Ala Gln Leu Gly Pro Met Arg Asp Leu Ile Glu Ser Ala
262      485      490      495
264 Asn Leu Asp Gly Trp Leu Glu Gly Pro Ser Phe Gly Gln Gly Ile Leu
265      500      505      510
267 Pro Ala His Ile Val Ala Leu Val Ala Lys Met Gln Gln Met Arg Lys
268      515      520      525
270 Met Gln Gln Met Gln Gln Ile Gly Met Met Thr Gly Gly Met Asn Gly
271      530      535      540
273 Met Gly Gly Gly Met Gly Gly Gly Met Asn Gly Met Gly Gly Gly Asn
274 545      550      555      560
276 Gly Met Asn Asn Met Gly Asn Gly Met Gly Gly Gly Met Gly Asn Gly
277      565      570      575
279 Met Gly Gly Asn Gly Met Asn Gly Met Gly Gly Gly Asn Gly Met Asn
280      580      585      590
282 Asn Met Gly Gly Asn Gly Met Ala Gly Asn Gly Met Gly Gly Gly Met
283      595      600      605

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Input Set : A:\231181.ST25.txt

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```

285 Gly Gly Asn Gly Met Gly Gly Ser Met Asn Gly Met Ser Ser Gly Val
286      610                      615                      620
288 Val Ala Asn Val Thr Pro Ser Ala Ala Gly Gly Met Gly Gly Met Met
289 625                      630                      635                      640
291 Asn Gly Gly Met Ala Ala Pro Gln Ser Pro Gly Met Asn Gly Gly Arg
292                      645                      650                      655
294 Leu Gly Thr Asn Pro Leu Phe Asn Ala Ala Pro Ser Pro Leu Ser Ser
295                      660                      665                      670
297 Gln Leu Gly Ala Glu Ala Gly Met Gly Ser Met Gly Gly Met Gly Gly
298                      675                      680                      685
300 Met Ser Gly Met Gly Gly Met Gly Gly Met Gly Gly Met Gly Gly Ala
301                      690                      695                      700
303 Gly Ala Ala Thr Thr Gln Ala Ala Gly Gly Asn Ala Glu Ala Glu Met
304 705                      710                      715                      720
306 Leu Gln Asn Leu Met Asn Glu Ile Asn Arg Leu Lys Arg Glu Leu Gly
307                      725                      730                      735
309 Glu
311 <210> SEQ ID NO: 3
312 <211> LENGTH: 259
313 <212> TYPE: PRT
314 <213> ORGANISM: Halobacterium salinarum
316 <220> FEATURE:
317 <223> OTHER INFORMATION: Amino acid sequence of bacteriorhodopsin from
318 Halobacterium salinarum
320 <400> SEQUENCE: 3
321 Met Leu Pro Thr Ala Val Glu Gly Val Ser Gln Ala Gln Ile Thr Gly
322 1      5      10      15
324 Arg Pro Glu Trp Ile Trp Leu Ala Leu Gly Thr Ala Leu Met Gly Leu
325      20      25      30
327 Gly Thr Leu Tyr Phe Leu Val Lys Gly Met Gly Val Ser Asp Pro Asp
328      35      40      45
330 Ala Lys Lys Phe Tyr Ala Ile Thr Thr Leu Val Pro Ala Ile Ala Phe
331      50      55      60
333 Thr Met Tyr Leu Ser Met Leu Leu Gly Tyr Gly Leu Thr Met Val Pro
334 65      70      75      80
336 Phe Gly Gly Glu Gln Asn Pro Ile Tyr Trp Ala Arg Tyr Ala Asp Trp
337      85      90      95
339 Leu Phe Thr Thr Pro Leu Leu Leu Leu Asp Leu Ala Leu Leu Val Asp
340      100     105     110
342 Ala Asp Gln Gly Thr Ile Leu Ala Leu Val Gly Ala Asp Gly Ile Met
343      115     120     125
345 Ile Gly Thr Gly Leu Val Gly Ala Leu Thr Lys Val Tyr Ser Tyr Arg
346      130     135     140
348 Phe Val Trp Trp Ala Ile Ser Thr Ala Ala Met Leu Tyr Ile Leu Tyr
349 145      150     155     160
351 Val Leu Phe Phe Gly Phe Thr Ser Lys Ala Glu Ser Met Arg Pro Glu
352      165     170     175
354 Val Ala Ser Thr Phe Lys Val Leu Arg Asn Val Thr Val Val Leu Trp
355      180     185     190

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**VERIFICATION SUMMARY**

PATENT APPLICATION: US/10/510,628

DATE: 10/16/2004

TIME: 08:47:59

Input Set : A:\231181.ST25.txt

Output Set: N:\CRF4\10162004\J510628.raw

L:10 M:270 C: Current Application Number differs, Replaced Current Application No

L:10 M:271 C: Current Filing Date differs, Replaced Current Filing Date